Space Weather Forecast

Issued on Tuesday, 15 February 2022 at 00:43 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

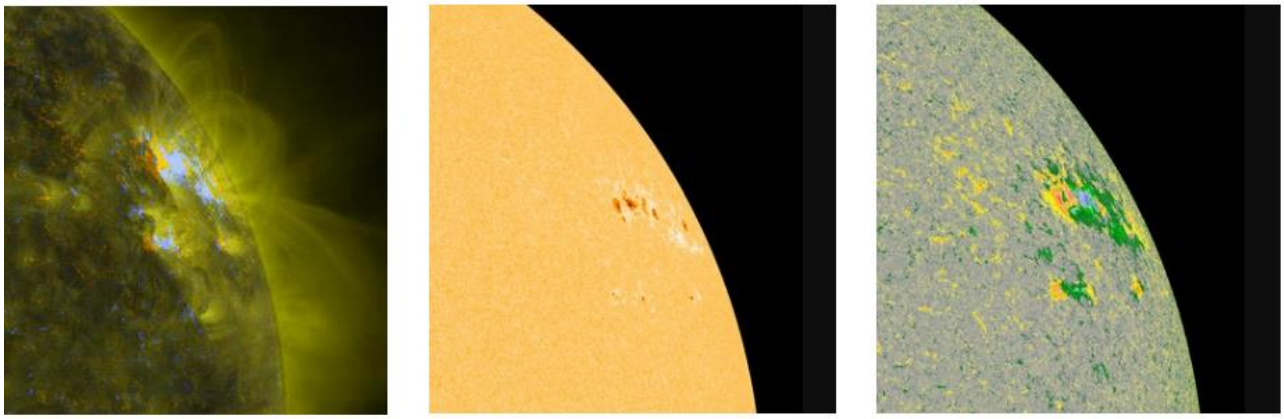
---

Space Weather Forecast Headline: Daily chance of Moderate-class X-ray flares and Minor (R1) Radio Blackouts.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity rose to moderate in the UTC day of Monday 14 February, with a Moderate-class X-ray flare observed from the largest and most magnetically complex region on the sun at 14/1731UTC. This was a long-period event and likely produced a Coronal Mass Ejection (CME) - this will be analysed once satellite imagery becomes available, although it is in a marginal location to have any impact at Earth.

Figure 1: 15/0000UTC imagery of the largest and most complex sunspot on the facing side of the sun, progenitor of the moderate-class X-ray. Shown are (left to right): False colour extreme UV and magnetic composite image showing a proxy for the magnetic field emanating from this region; a visible image showing the spots as they appear to the eye and a magnetic image showing the regions of opposing polarity more clearly.



The sunspot responsible is a long-term resident, which underwent some proliferation in its intermediate spots in the period as well as areal growth, although detail in this group is becoming difficult to ascertain owing to the narrowing viewing angle as it nears the sun's western edge. There were up to four other sunspot regions on the sun, mainly relatively simple bipolar groups, although all with a slight growth trend. This left the final group as a simple unipolar spot in the eastern solar hemisphere, with no notable changes observed.

No CMEs were in evidence in available imagery in the 24 hours.

Solar Wind / Geomagnetic Activity: Earth is currently undergoing a gradual exit from a 'coronal hole' fast wind, with the solar wind speed falling from elevated to reach slightly elevated levels by the period's end. The number of particles in the solar wind and their associated magnetic field were both unremarkable in the 24 hours.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

The net result of the above solar wind measures was provisionally quiet geomagnetic activity, with a slight downward trend evident.

Energetic Particles / Solar Radiation: No solar radiation storms were observed, despite the moderate-class X-ray flare from near the western solar horizon.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to carry a daily chance (30%) of Moderate-class flares - these most likely from the largest sunspot on the sun until midweek, at which point this risk should then gradually fall as it passes further onto the far side.

Solar Wind / Geomagnetic Activity: No CMEs feature in this forecast period. The only 'coronal hole' fast wind in the forecast period is currently affecting Earth, and activity is considered very likely to have peaked. Increasingly quiet geomagnetic activity is therefore expected in the four days - well below Minor Storm G1.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, although there is a daily Slight Chance of S1, mainly up to and including midweek, before the crossing to the far side of the largest spot.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	30	30	20	5
Very Active	R3 to R5 X	No	2	2	2	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	2
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.